Solubility and Precipitation

Introduction

Some combinations of ionic solutions produce insoluble products called precipitates and some produce no visible reaction at all. In this investigation you will be performing several double replacement reactions by combining several pairs of dissolved ionic substances. Using a solubility chart, you should be able to identify the precipitates that you observe. You also should be able to recognize some trends in solubility of some ions.

Materials

- 0.1 M solutions of the following chemicals (dispensed in labeled Beral pipets): $AgNO_3$, $NaNO_3$, Na_3PO_4, K_2CO_3, $FeCl_3$, and $CuSO_4$.
- well plate
- goggles

Procedure

1. Put on goggles. Using your data table as a guide, combine 1 drop of the solution shown at the top of column with 1 drop of the solution shown to the left of the row in a well. For example, the well in the upper left-hand corner, (#1), should contain one drop of $AgNO_3$ plus 1 drop of $CuSO_4$.
2. After you have made all 15 combinations, examine your well plate against a light background as well as a dark background. If the solution combination remains clear, record NR (no reaction) in the data table. If haziness or cloudiness occurs, a precipitate has formed. Record as PPT and also indicate the color of the precipitate.
3. Clean up as directed by your teacher and wash your hands.

Data Table

	$AgNO_3$	$NaNO_3$	Na_3PO_4	K_2CO_3	$FeCl_3$
$CuSO_4$	(1)	(2)	(3)	(4)	(5)
$FeCl_3$	(6)	(7)	(8)	(9)	
K_2CO_3	(10)	(11)	(12)		
Na_3PO_4	(13)	(14)			
$NaNO_3$	(15)				

Solubility and Precipitation

Analysis and Conclusions

1. Write balanced equations for each double replacement reaction. If no precipitate formed, indicate the product as no reaction (NR). If a precipitate did form, consult your solubility chart to identify it. Indicate the insoluble product as a solid (s), and the remaining spectator ions as aqueous (aq).

(1)

(2)

(3)

(4)

(5)

(6)

(7)

(8)

(9)

(10)

(11)

(12)

(13)

(14)

(15)

2. Study your data for trends.

(A.) Which negative ion(s) did not form any precipitate?

(B.) Which positive ion(s) did not form any precipitate?

(C.) Which negative ion(s) usually or always formed a precipitate?

(D.) Which positive ion(s) usually or always formed a precipitate?